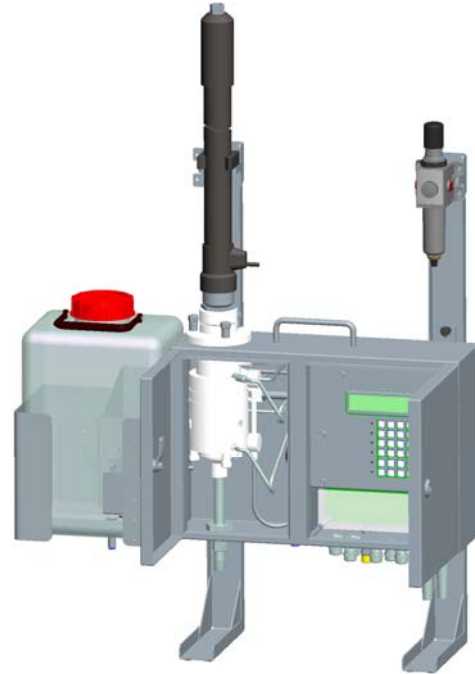


## HYGROPHIL H 4230-10 process hygrometer

Continuous humidity measurement in industrial processes.

For very high demands in terms of being resistant to corrosion and dirt. Particularly suitable for cases where the air to be measured contains oil vapours, dust, water-soluble gases, solvents, acids and aggressive chemicals.

The device is certified by the German Technical Inspection Agency (TÜV) for the performance of flue gas measurements in accordance with the Federal German Pollution Control Act (BImSchV) (17th Implementing Ordinance).



In many processes, monitoring and controlling gas humidity is a must if you want to achieve a consistently high product quality, use energy efficiently and adhere to the regulations regarding emission limits. **HYGROPHIL H 4230** is a special measuring device that continuously measures the humidity levels during industrial processes.

Thanks to the carefully chosen materials and constant scavenging, the system is especially suitable for cases where the air to be measured contains oil or fat vapour, solvents, water-soluble gases or salts.

Examples:

Hot-air tunnels for cooking foodstuffs

Fertiliser dryers

Various chemical processes

It can even be used in cases where the air to be measured is highly contaminated with acids or other aggressive substances (such as sulphuric acid, hydrofluoric acid or nitrohydrochloric acid).

Examples:

Copper-nickel works

Large combustion plants

Combined heating and power stations

Waste incineration plants

In power stations, incineration plants, and other industrial facilities, the amount of water vapour can also be measured in non-purified flue gas immediately downstream of the filter. This allows you to detect not only pipe damage, but also hairline cracks in the heat exchanger.

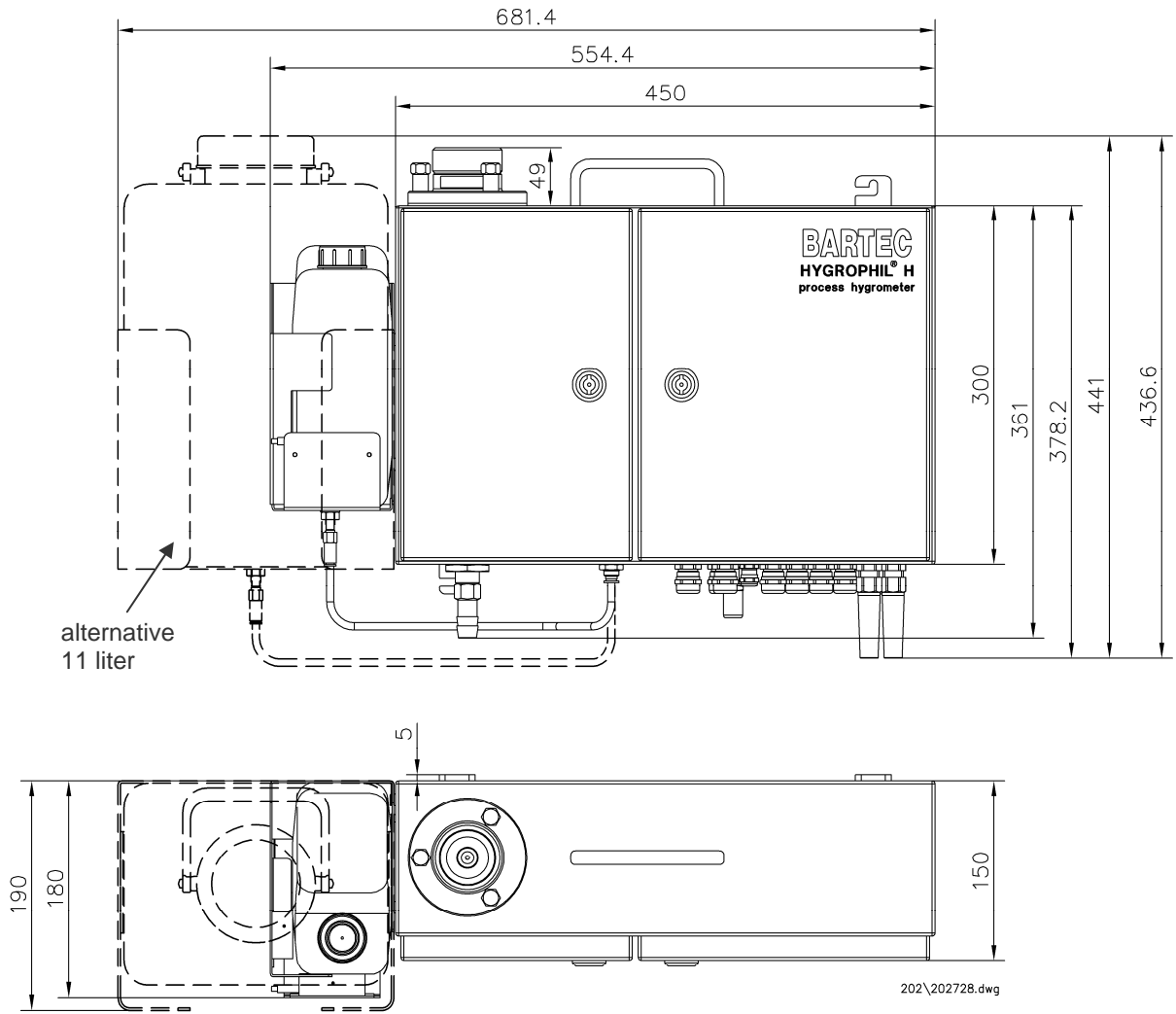
The portable design is particularly suitable for mobile application at the facilities of test centres and agencies for monitoring plants and at energy information centres.

Thanks to the standard method used, HYGROPHIL H is also suitable for use as a reference device.

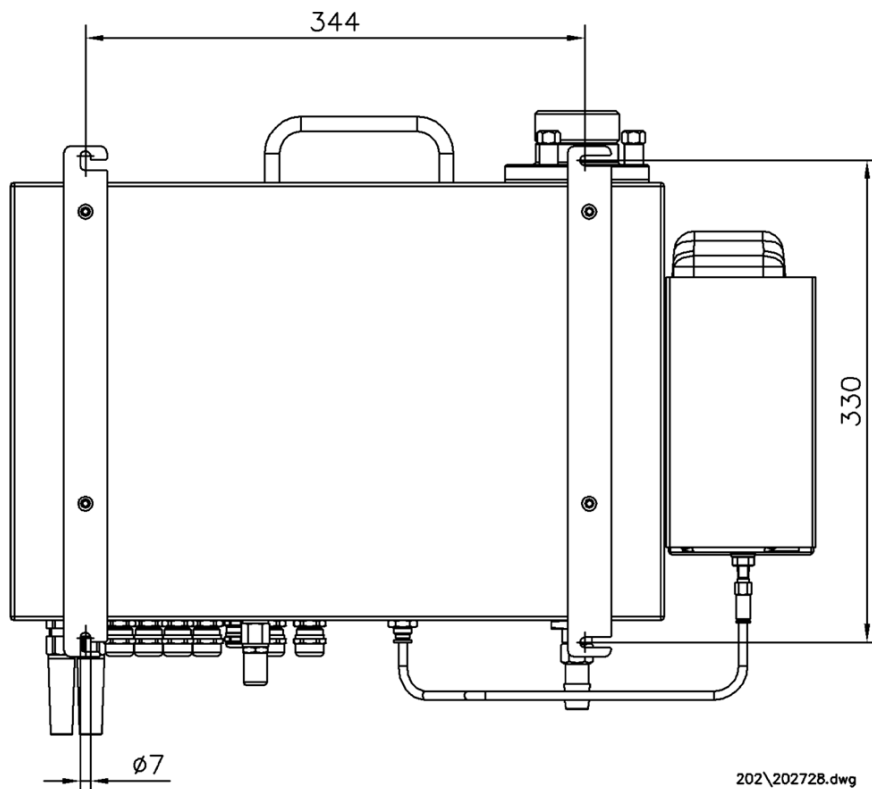
- **Measurement range:**  
20...100 °C DT
- **Primary measurement variables:**  
TT, HT, SP, aux. temperature
- **Calculated measurement variables:**  
DT, MH, SH, vol.%, VP, h, DVP
- **Secondary standard method in accordance with DIN 50012**
- **1 additional temperature measuring circuit for PT100**
- **Current outputs 2x 0/4...20 mA electrically isolated**
- **Profibus DP field bus**
- **Certified by the TÜV for use in accordance with the Federal German Pollution Control Act (BImSchV) (13th and 17th Implementing Ordinances)**

<b>Technical data</b>					
<b>Humidity measurement</b>					
Measurement principle	Psychrometric gas humidity measurement in line with the impact jet method				
Transducer	PT 100/ 4-conductor in accordance with DIN IEC 751				
Computational accuracy	≤ 0.01%				
Computing time	Approx. 2s				
Settling time	t <sub>90</sub> = 90s (for sudden change in SH from 10 to 190 g/kg)				
Air/gas throughput	Max. 17,5 NI/min				
Water intake	Max. 25 ml/h (tube pump)				
Water reserve	2l (enough for approx. 3 days) or 11l				
Compressed air intake	2...5 bar (max. air consumption 2000NI/h)				
<b>Measured variable inputs</b>					
Measured variable		Measurement range	Resolution	Accuracy	Type
Dry temperature	TT	0...140 °C	0.1 °C	≤ 0.5% of the measurement range	Primary
Wet temperature	HT	0...140 °C			
Temperature	T1	0...200 °C			
Absolute pressure	SP	500...1500 hPa	1 hPa	≤ 1%	Calculated
Dew-point temperature	DT	20...100 °C	0.1 °C		
Volumetric content H <sub>2</sub> O	Vol.%	2...100 %	0.1 %		
Absolute humidity	MH	15...1000 g/kg	1 g/kg		
Specific humidity	SH	15...1000 g/kg	1 g/kg		
Enthalpy	h	35...1000 kJ/kg	1 kJ/kg		
Current vapour pressure	VP	10...1000 hPa	1 hPa		
Saturation deficit	DVP	0...1000 hPa	1 hPa		
<b>Outputs</b>					
<b>Signal output</b>					
Analogue output	2 electrically isolated output channels, can be assigned to each of the measurement ranges, spread, error behaviour programmable				
Output signal	0...20 mA or 4...20 mA (programmable), linear				
Permissible load	≤ 500 Ω				
Accuracy	≤ 0.2% of the associated measured value				
<b>Inputs</b>					
External water detector	24 V d.c., NPN				
T1 <sub>extern</sub>	PT 100/ 4-conductor in accordance with DIN IEC 751				
<b>Data interface</b>					
Field bus interface	Profibus				
<b>Electrical data</b>					
Auxiliary power	Measuring unit: 90...264 V a.c., 47...63 Hz, approx. 30 VA Heating hose: 230 V or 115 V a.c.; approx. 100 VA/m				
<b>Relays</b>					
Warn relay	Display of warnings	Load: 1 A/24 V d.c., at least 10 mA			
ERROR-relay	Display of failures	Load: 1 A/24 V d.c., at least 10 mA			
<b>Ambient conditions</b>					
Permitted working temperature	+5...+50°C, with enclosure 4230-119 for explosion protected area 22: - 30 °C ... + 50 °C				
Permitted storage temperature	-20...+70°C (without water)				
Climate category	KWF in accordance with DIN 40040				
Reference conditions	23°C ±2°C / 230V ± 2%				
<b>Mechanical data</b>					
Enclosure	Stainless steel enclosure; protection rating IP64 in accordance with DIN 40050				
Dimensions	450×410×150 mm (without mount)				
Assembly drill holes	347x330 mm, 4×Ø7x13mm (M6)				
Weight	Approx. 12.5 kg				
<b>Connections</b>					
Electrical connection	Screw terminals 0.5-1.5 mm <sup>2</sup> ; cable feed via M 16x1.5 cable gland				
Compressed air supply	Plug nipple NW 7				
Gas sampling hose connection	Special connection				

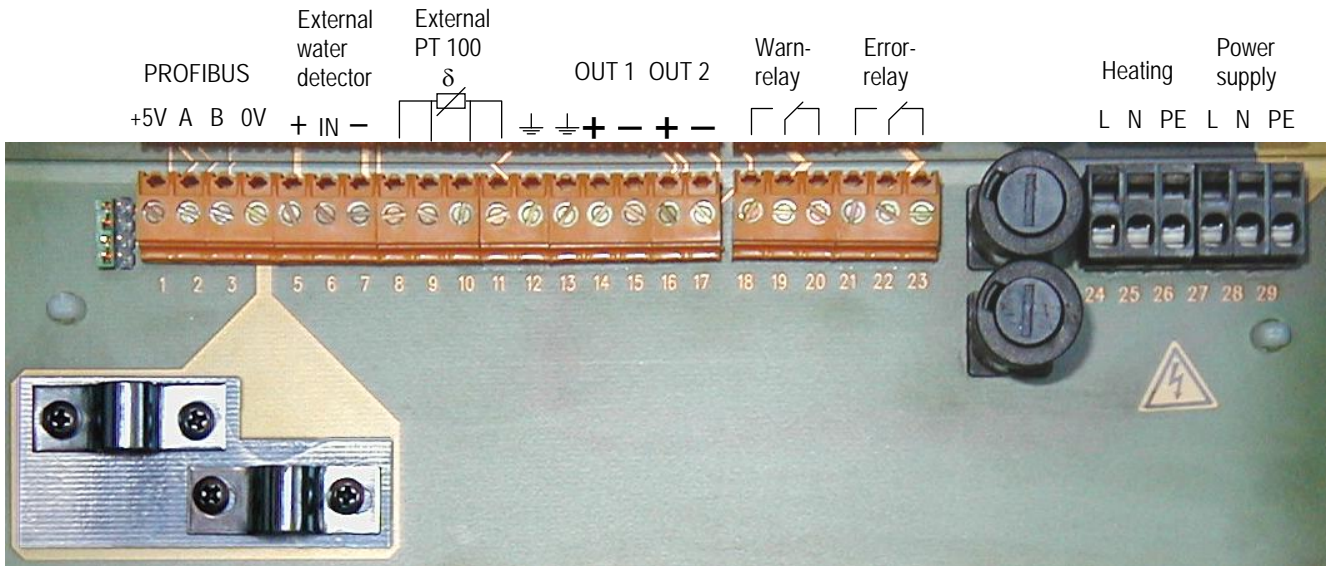
Dimensions



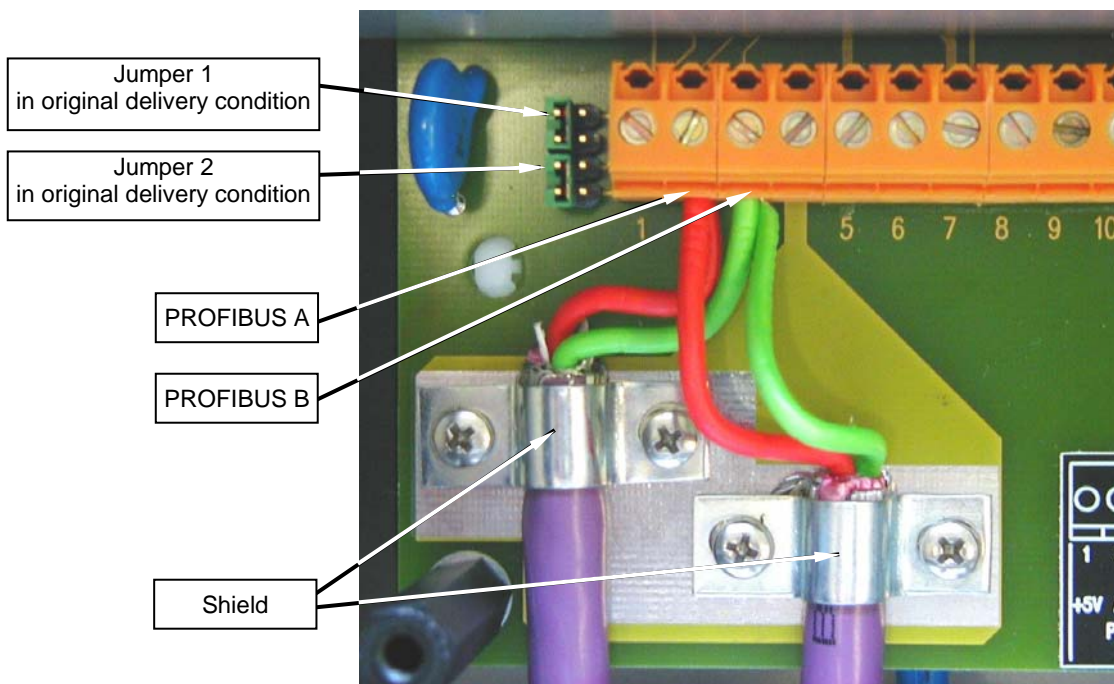
Assembly drill holes



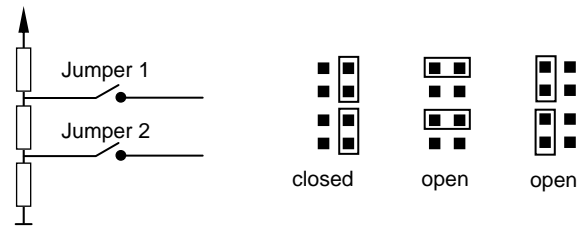
# Assignment of terminals



The Profibus cable is connected to terminals 2 (Profibus A) and 3 (Profibus B).



If the device is the last user on the Profibus, the two jumpers must be closed.



## Details when ordering

### Basic equipment

#### HYGROPHIL H Type 4230-10

Corrosion-proof, 115/230 V a.c.

Scope of delivery: HYGROPHIL-H in accordance with order number; 1 litre of surfactant

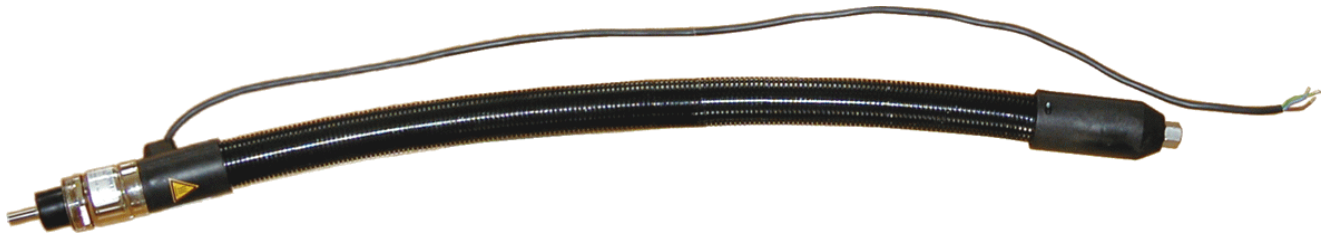
Order number: 202728

### Accessories

#### Gas sampling hose, Type 4230-100

Flexible, water-resistant gas sampling hose for feeding measurement gas without condensate (max. input temperature 200 °C); Including 1 mount per metre; Operating voltage: 230 V a.c. or 115 V a.c.

Connection type: Universal conical nipple G3/8" DKR DIN3863



Length	Order number (230 V)	Order number (115 V)	
1,0 m	202729		
1,3 m	289818		
2,0 m	216375		
3,0 m	202727		
4,0 m	216376		
5,0 m	216377		
6,0 m	290074		
7,0 m	232553		306255
8,0 m	365576		302536 292338
10,0 m	294604		
12,0 m	233793		
16,0 m	281348		
Gas sampling hose (Hastelloy)			
2,0 m	292910	(100 W/m)	
12,0 m	371852	(100 W/m)	

#### Gas sampling hose Ex Type 4230-114

Flexible, water-resistant gas sampling hose for feeding measurement gas without condensate (max. input temperature 120 °C); Including 1 mount per metre

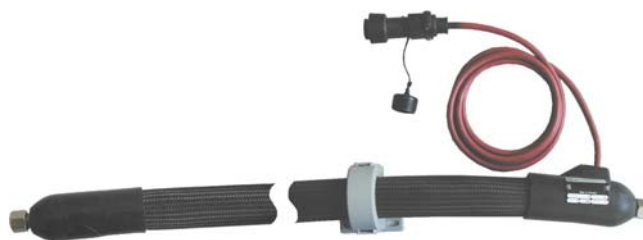
Operating voltage: 230 V a.c. or 115 V a.c.; Connection type: Universal conical nipple G3/8" DKR DIN3863



Length	Order number (230 V)	Order number (115 V)
4,0 m	321356	Order numbers for 115 V version on request
6,0 m	321357	
10,0 m	279259	
12,0 m	241974	
15,0 m	300500	

**Gas sampling hose, Type 4200-06**

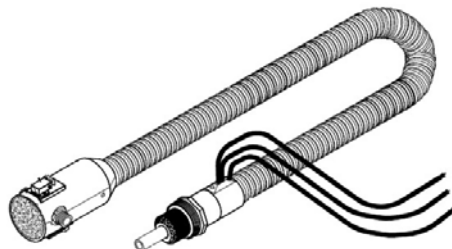
Connection type:  
 Universal conical nipple  
 G 3/8" DKR DIN3863  
 PT 100



Length	Order number (230 V)
13,0 m	U7521113420006
15,0 m	U7521115420006
19,0 m	202222
20,0 m	U7521120420006
23,0 m	U7521123420006
24,0 m	320764
26,0 m	220718

**Temperature Controller TRM/20, 0-200°C**

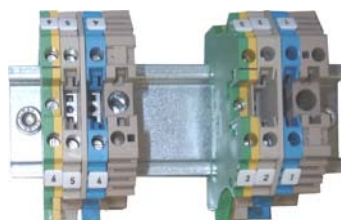
Order number: 314300

**Measurement gas tube with switch, Type 4230-112**

Length 2,5m      Order number: 283058  
 (230 V)

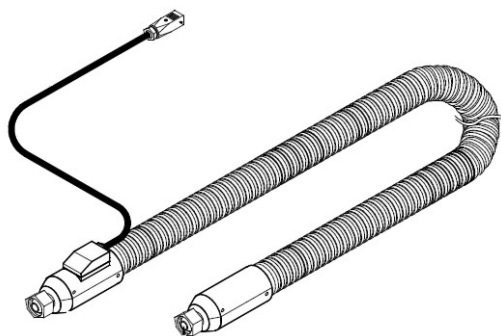
**Terminal strip Type 4230-134**

for connecting the gas sampling hose with switching valve



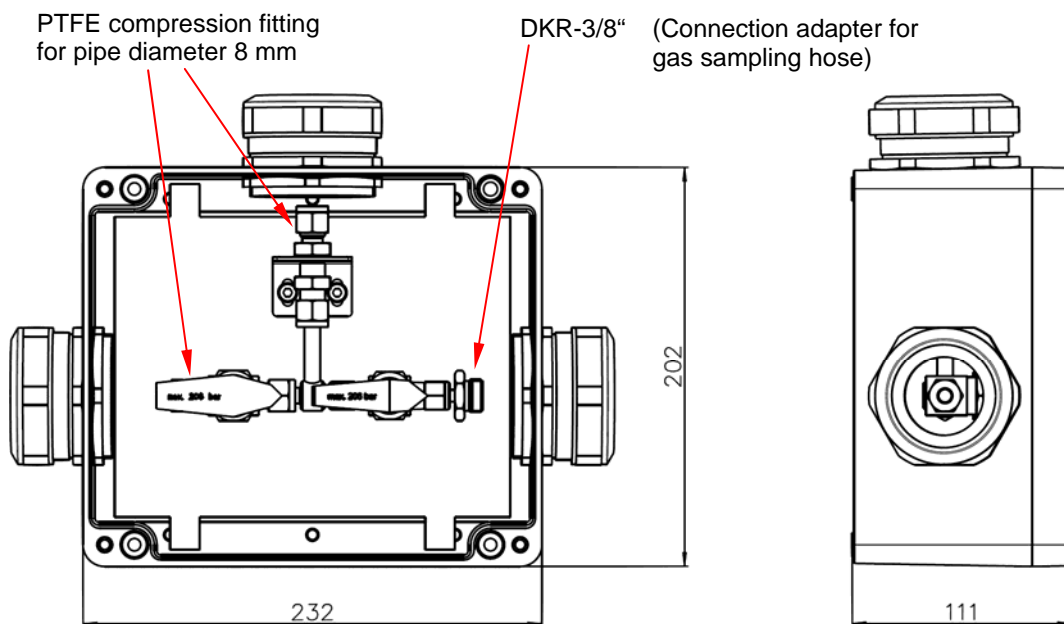
Order number: 368952

**Gas sampling hose self-regulating, Type 4230-128**



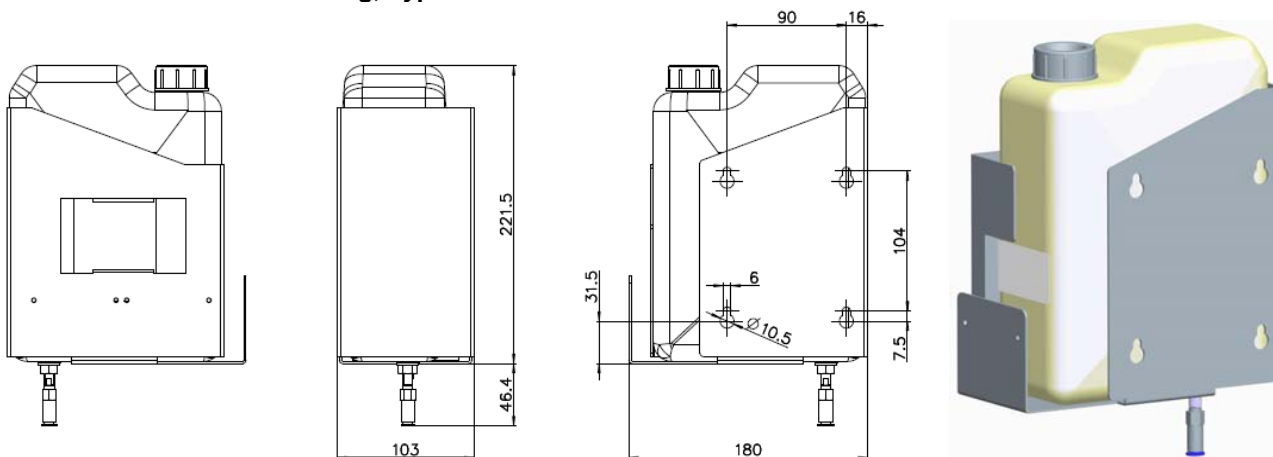
Length	Order number (230 V)
4,0 m	367556
8,0 m	348425

**Heated Box, 230VAC, with manual valves, Type 4230-135**



Order number: 376237

**Water container 2l with holding, Type 4230-123**



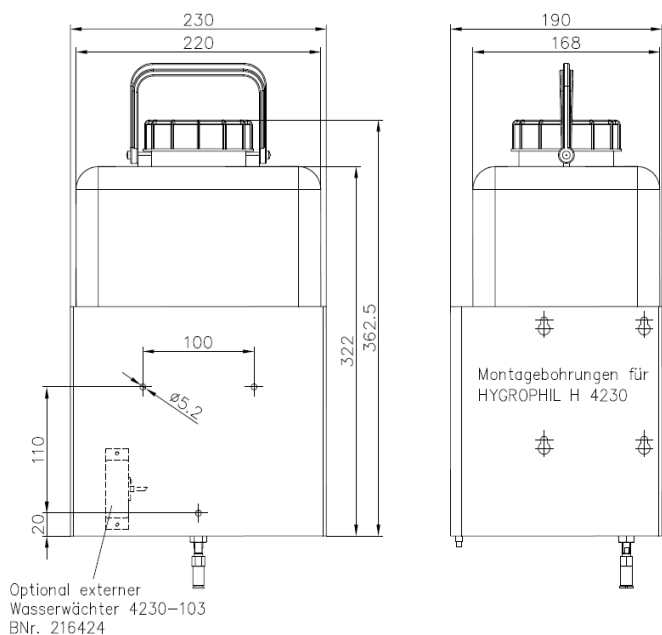
Order number: 304510

**Water container, Type 4230-300**



Order number: 202156

**Water container 11l, Type 4230-102**



Order number: 216420

**Water container 11l without holding, Type 4230-133**

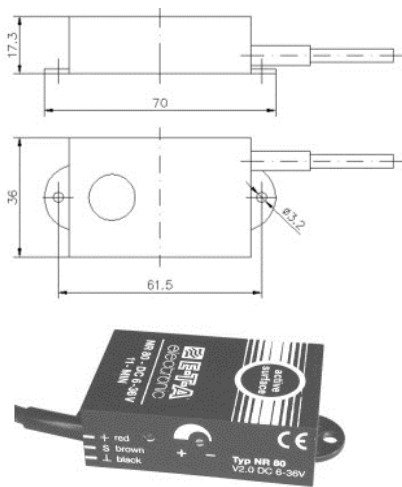


Order number: 367964

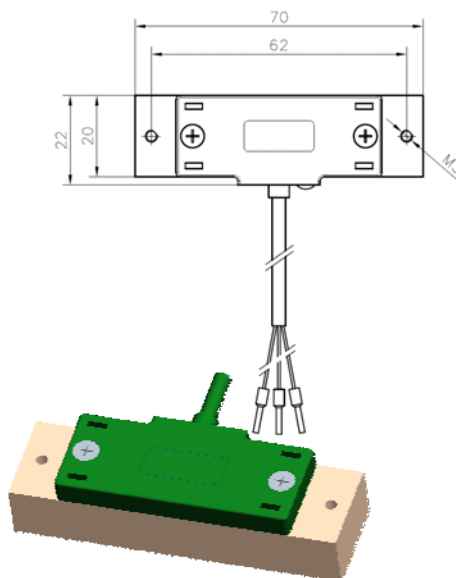


**Water sensor external, Type 4230-103**  
 For monitoring the fill level in the water storage tank

**Old construction type**



**New construction type**



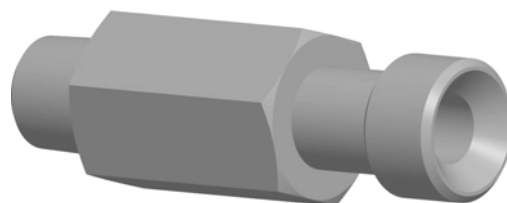
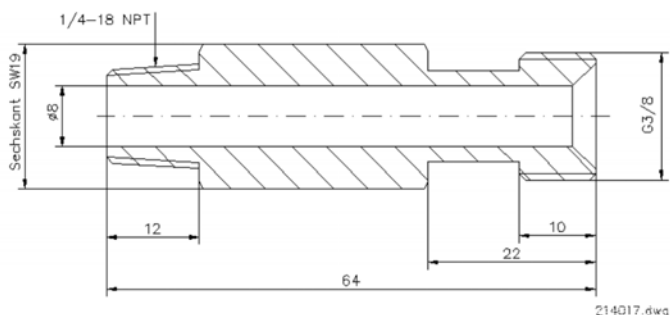
Order number: 216424

**Adapter for gas sampling hose**

**Type 4230-00-044**  
 (DKR-3/8" to NPT-1/4")

**Adapter for gas sampling hose Hastelloy**

**Type 4230-00-068**  
 (DKR-3/8" to NPT-1/4")



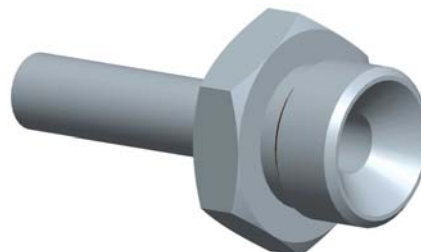
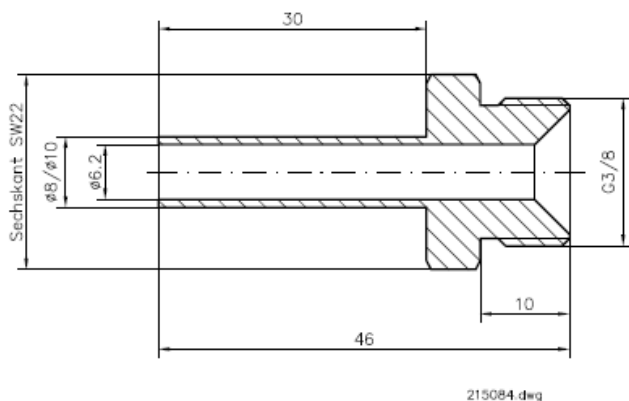
Order number: 214017

292981

**Adapter for gas sampling hose**

**Type 4230-00-046**  
 (DKR-3/8" to 8 mm Swagelok®)

**Type 4230-00-061**  
 (DKR-3/8" to 10 mm Swagelok®)



Order number: 215084

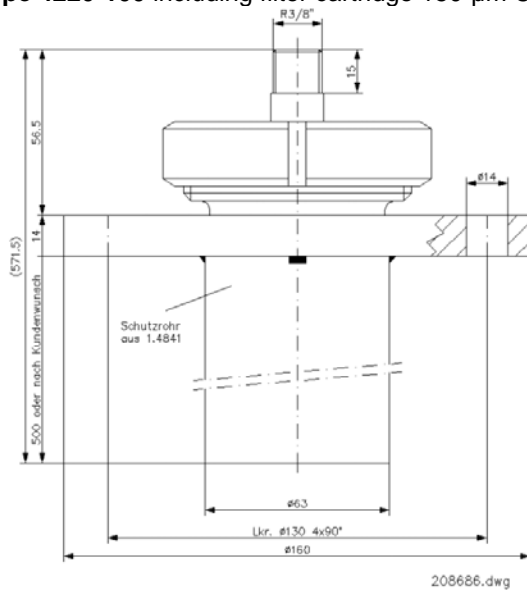
246326

**Adapter 6HMK4SS Straight connector**  
(DKR-3/8", stainless steel)



Order number: 320763

**Standard filter, Type 4220-100 including filter cartridge 150-µm CrNi Steel 1.4404**



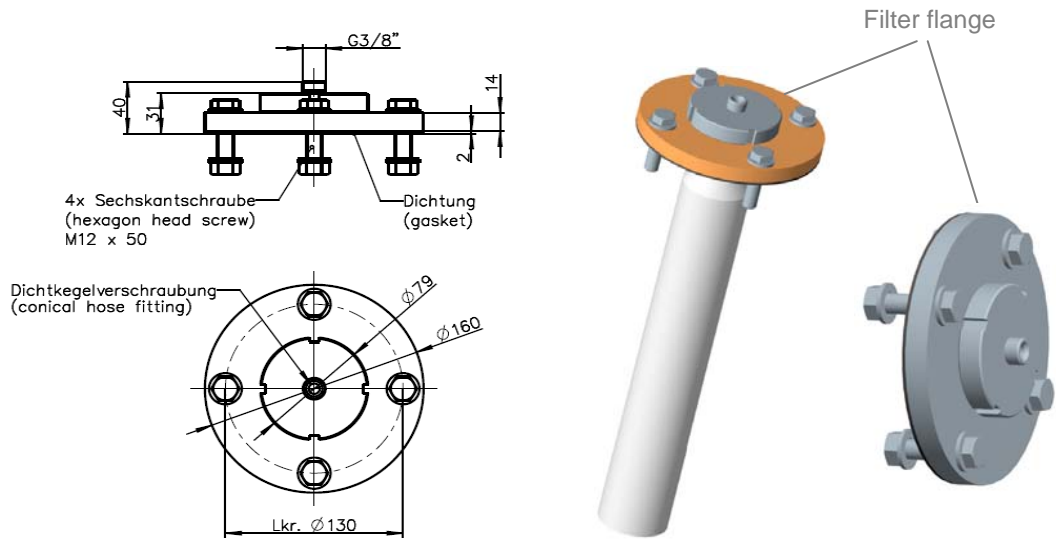
Order number: 208686

**Spare filter for standard filter Type 4220-106**  
150 µm, Cr-Ni steel 1.4404



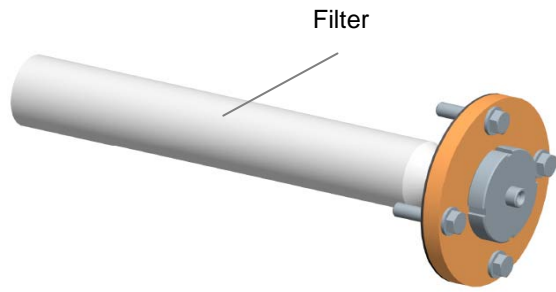
Order number: U 116006

**Filter flange , Type 4230-125 DN65/PN6**



Order number: 296346

**Filter**



V20-6; 500 °C max.; 520 x 60 mm  
 V20-T; 200 °C max.; 400 x 40 mm  
 Sampling filter type 4230-131; 150 °C max.; 700 x 40 mm

Order number	
Filter	Replacement hose
319545	
302189	234660
365641	365652

**Gas sampling sensor**



Type	Order number (230 V)	Order number (115 V)
SP 2000-HF-GF 150	214334	292337
SP 2000HF/HC (Hastelloy)	292899	

**Glass fibre filter Type GF 150**  
 for Gas sampling sensor Type SP 2000  
 0,1 µm



Order number: 220232

**Sampling pipe for Gas sampling sensor**



Type	Length	for gas sampling sensor type	Order number
SP 2000 /SS	1 m	SP 2000 / SP 2200	214333
	2 m		372218
SP 2000/HC	1 m	SP 2000HF/HC (Hastelloy)	292898

**Sampling sensor, 230V, 0 - 180 °C, flushable  
Type SP2200-HF//BB**

- Accessories:
- Hexagon screws M 12x60
  - Fitting washers and nuts
  - Gasket Ø 160/68 mm
  - Instructions



Order number: 279032

**Sampling sensor, 230V, with magnetic valve terminal  
Type SP2200-HF/C//BB**



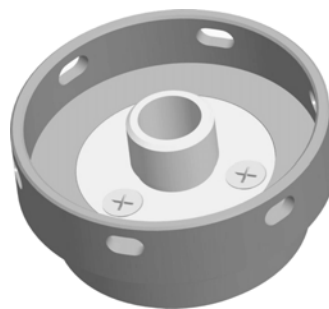
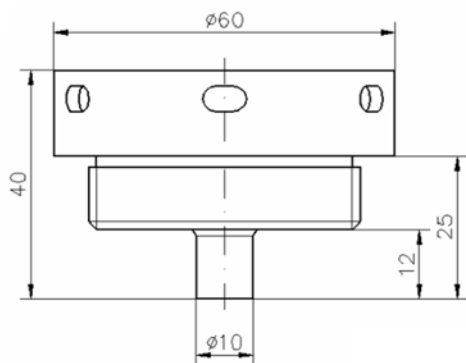
Order number: 365577

**Sampling sensor, 230V, 0 - 180 °C  
Type SP2200-HF/C//BB/F**



Order number: 372217

**Adapter for gas sampling hose 4220 to 4230, Type 4230-101**



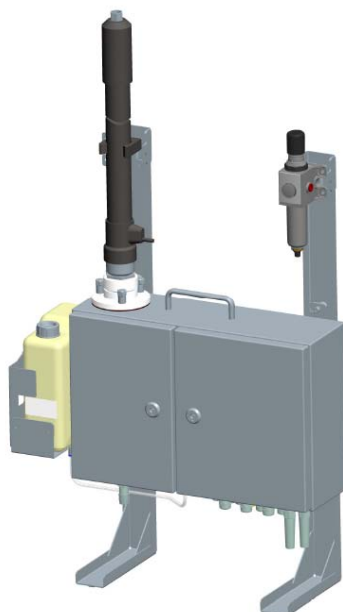
Order number: 216421

**Nut for gas sampling hose, Type 4230-00-042**



Order number: 202388

**Stand holder, type 4220-35**

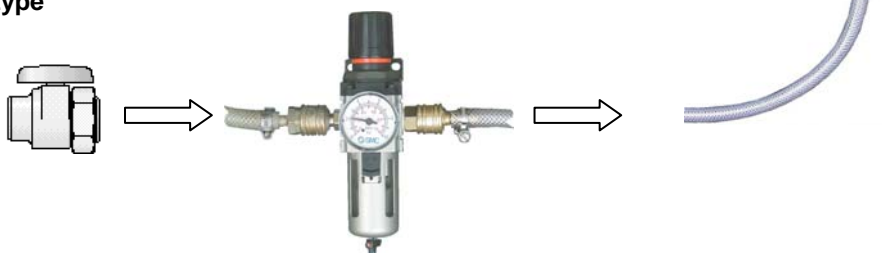


Order number: U 3401422035

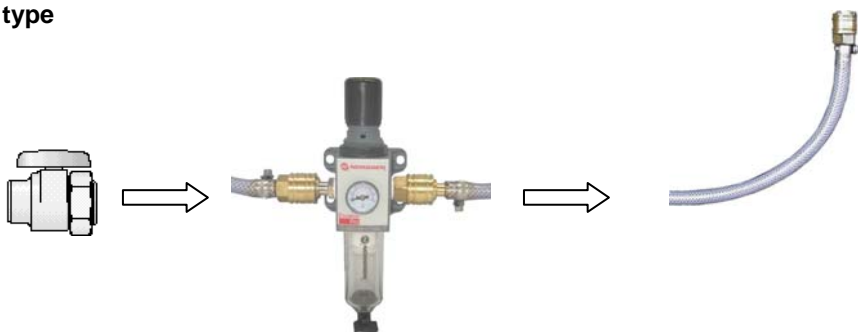
**Compressed air maintenance unit, Type 4220-30**

With compressed air regulator and filter

**Old construction type**

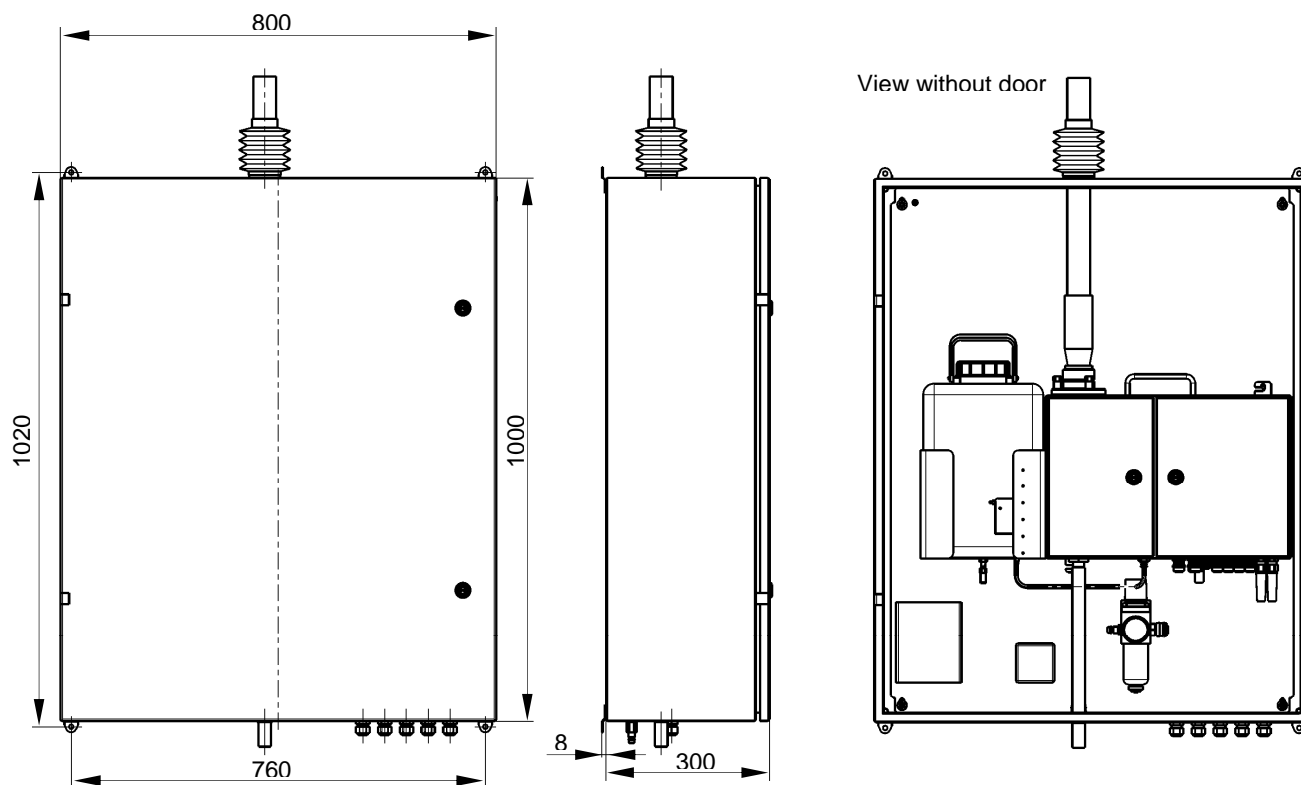


**New construction type**



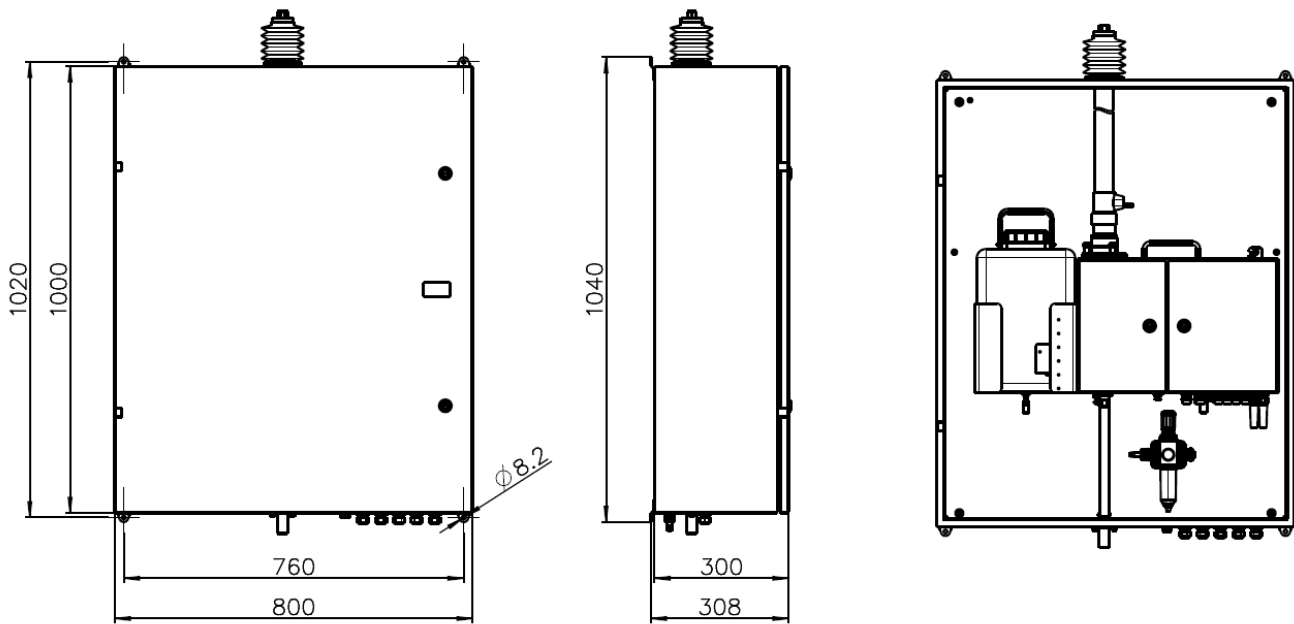
Order number: U3401422030

**Enclosure Type 4230-119 (Ex Zone 22)**



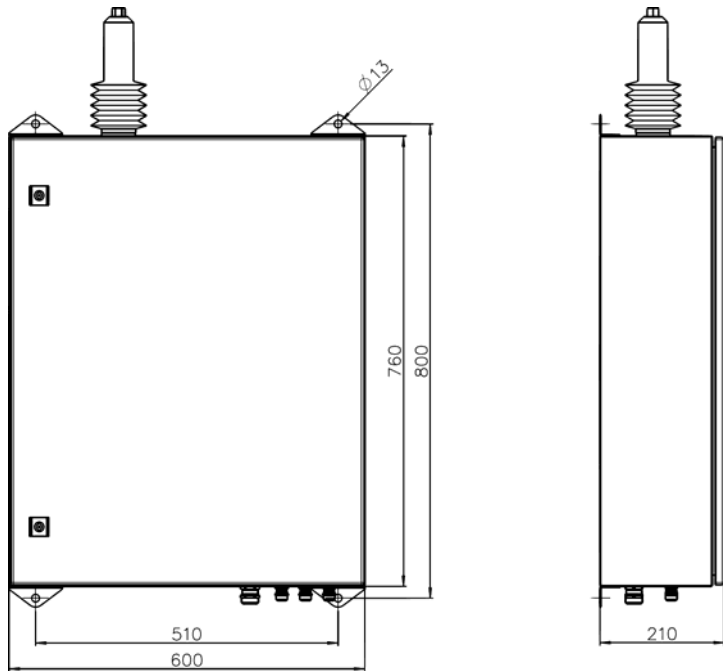
Order number: 295991

**Enclosure Type 4230-127 without heating (Ex Zone 22)**



Order number: 321358

**Enclosure with heating hose-passage Type 4230-129**



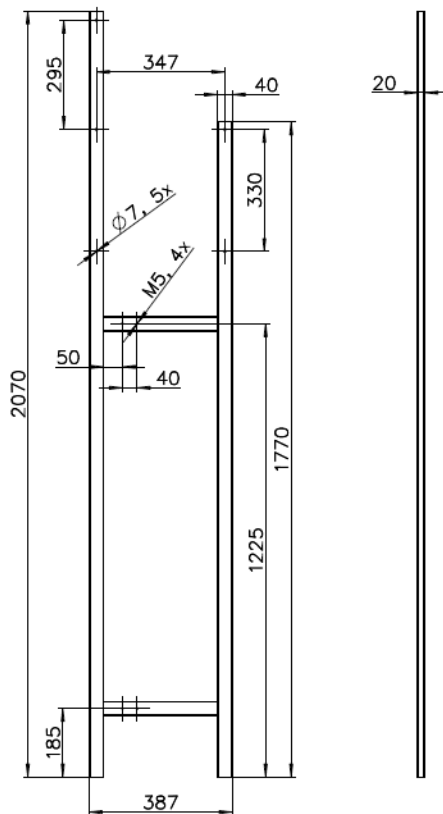
Order number: 352826

Flange carrying Type 4230-126



Order number: 312707

Assembly stand Type 4230-120

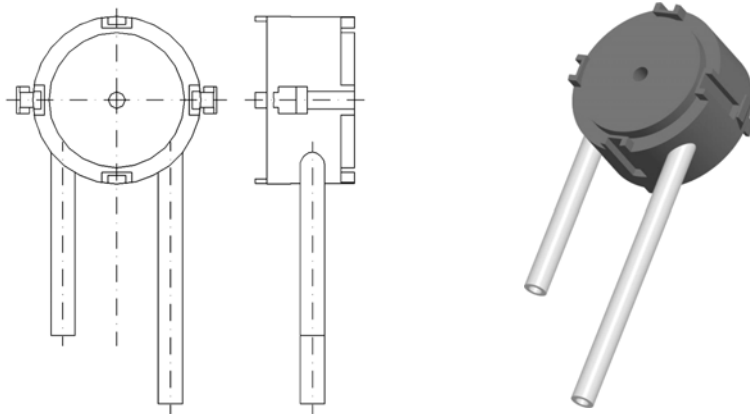


Order number: 300545



## Spare parts

### Tube pump cartridge, Type 4230-104



Order number: 216422

### Measuring chamber with ejector, Type 4230-301

Without probes



Order number: 202383

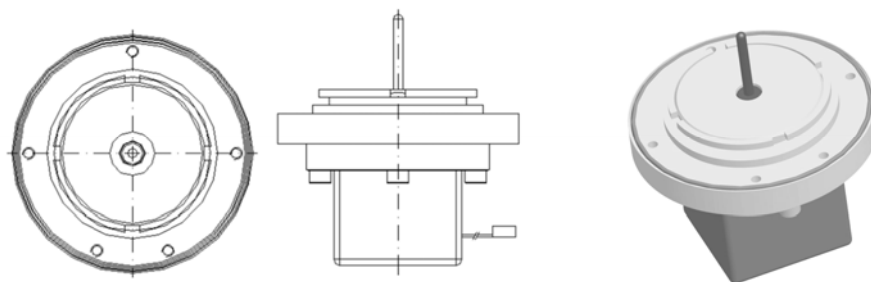
### Water sensor, Type 4230-302

For monitoring the fill level in the measuring cell



Order number: 202823

### Pump motor, Type 4230-303



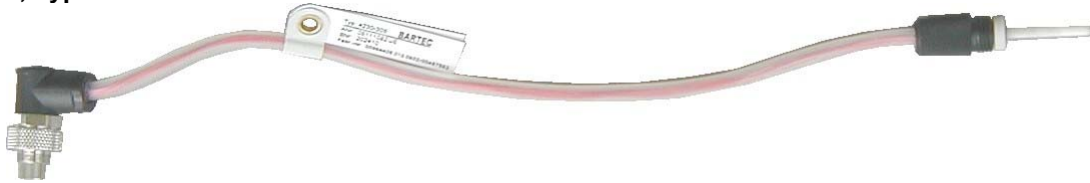
Order number: 202409

### Probe TT, Type 4230-304



Order number: 202411

### Probe HAT, Type 4230-305



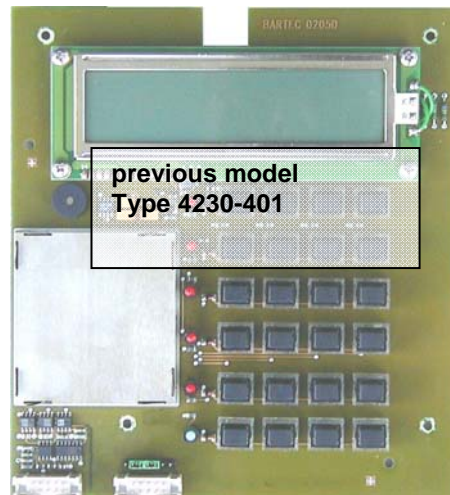
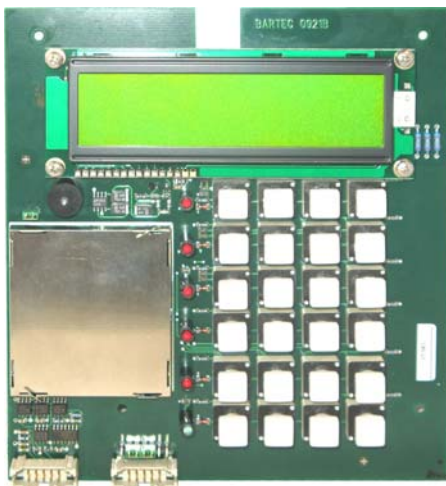
Order number: 202410

### Proportional valve, Type 4230-308



Order number: 202781

### Display - / Profibus board, Type 4230-122



Order number: 301656

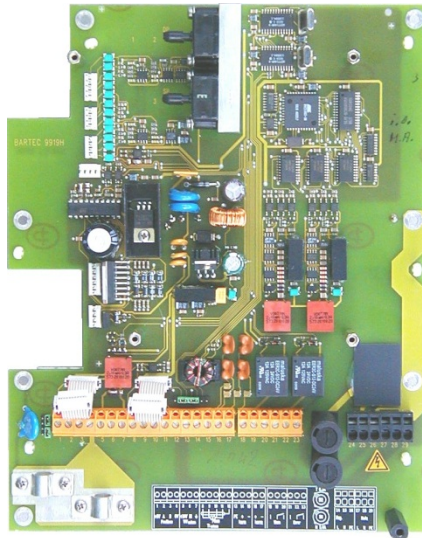
### Cover Plate with Keyboard Foil, Type 4230-121

The cover Plate is used in combination with the Display/PROFIBUS board type 4230-122. When replacing the display/PROFIBUS board type 4230-401 (installed in devices with A-N<sup>o</sup>. up to 1001 0456) by the display/PROFIBUS board type 4230-122 you must also replace the cover Plate.



Order number: 301657

**Electronics board with power supply unit, Type 4230-400**



Order number: 202412

**Tensid**

1l, PE-Bottle

Order number: U04014220201